ADOT
Air Quality Management Guidebook

Conformity Procedures

Goal: Document Existing ADOT Processes & Provide Recommendations for Updates

Purpose of Working Paper 3

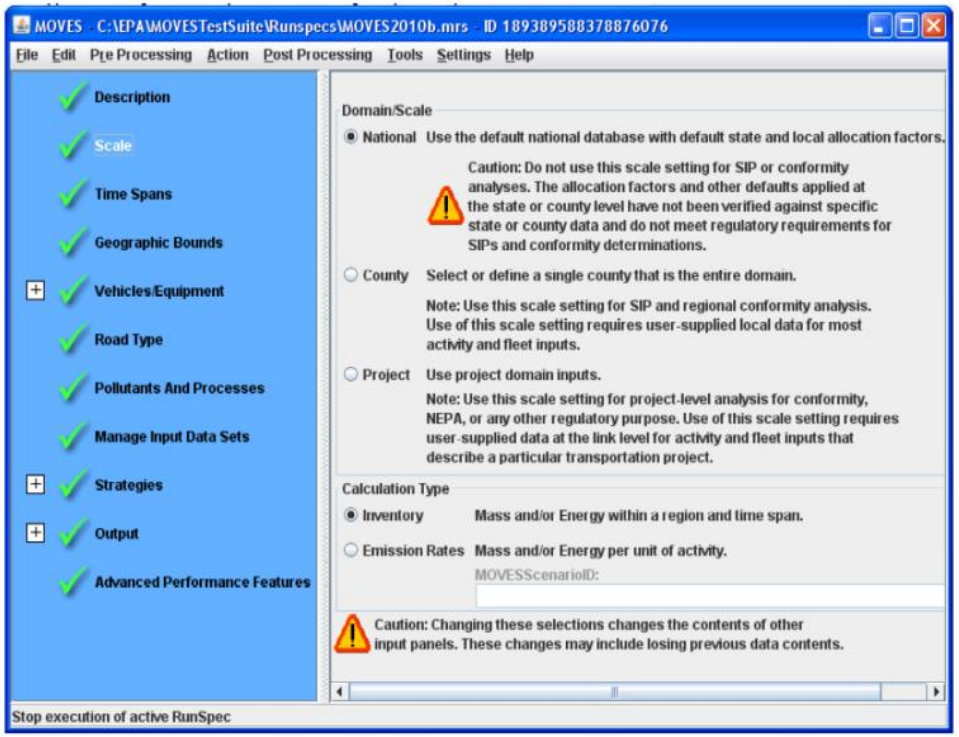
- Discuss key technical issues related to MOVES
- Assess past practices (Mobile6.2) and sample ADOT analyses using MOVES
- Work towards recommended approach and items to include in guidebook
  - ✓ Data Sources
  - ✓ MOVES Operation and Processing
  - ✓ MOVES Inputs
- Provide example PM hot-spot consultation

What Goes into the Guidebook?

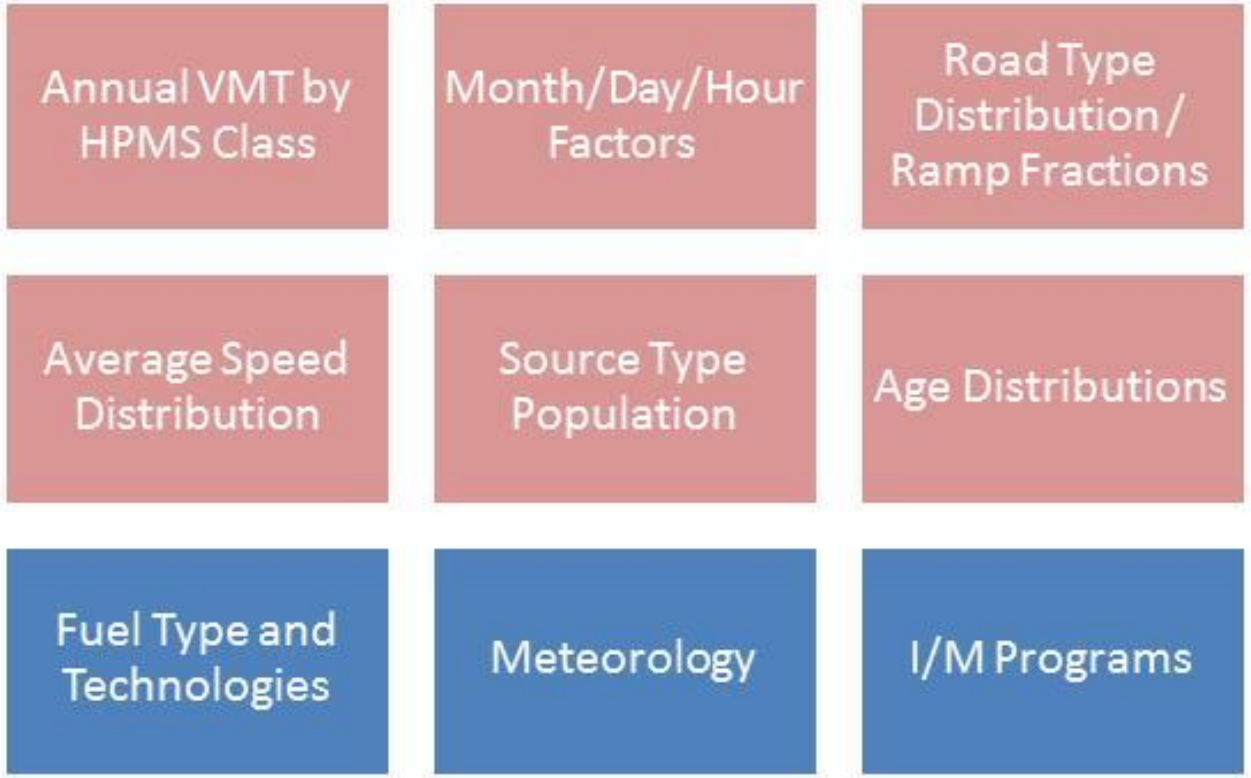
- There are recommendations / considerations that can be stressed in preparing MOVES inputs
  - ✓ Complement EPA guidance
  - ✓ Alternatives for technical robustness
- Batch processing / Post Processing
  - ✓ Will depend on each area's tools and resources
  - ✓ Flexibility – there are alternative methods for MOVES application
- PM Hot-Spot Screening
  - ✓ Process options / input from federal partners

MOVES Model

- Key issues with MOVES integration
- Available EPA guidance by type of analysis



MOVES Input Data



Annual VMT

What are the available data sources? Roles?

Primary Data Source

- MPO Regional Model
- Statewide Model

➢ VMT by time period
➢ Vehicle type breakdown

Supplementary Data

- HPMS VMT Totals by County

➢ Missing local VMT
➢ Reconciliation (if necessary)

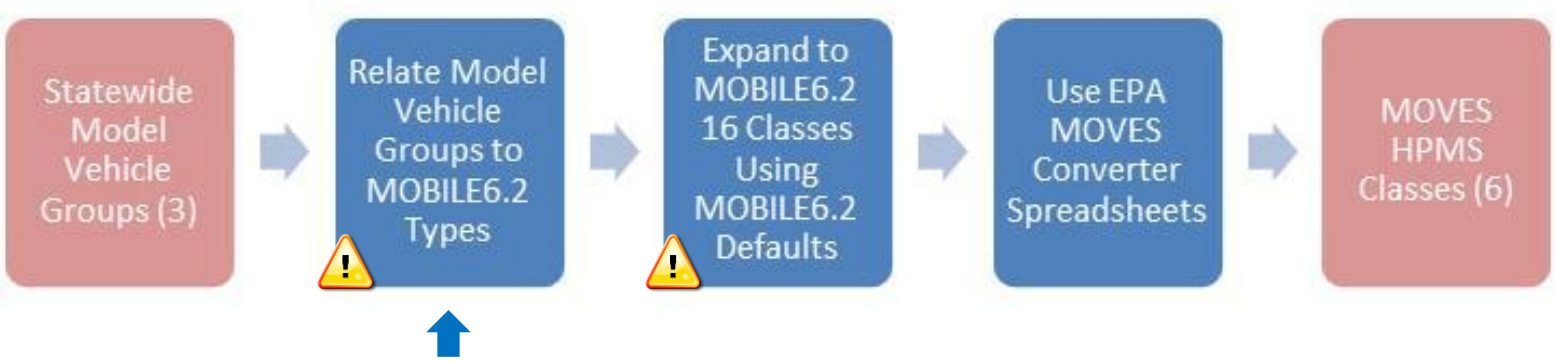
Other Support Data

- HPMS Source Traffic Database

➢ Model validation data

Annual VMT – By Vehicle Type

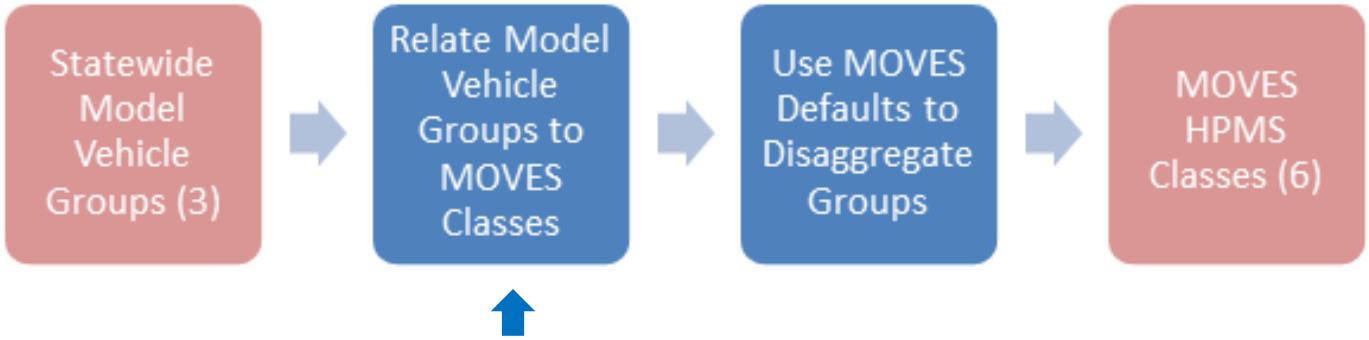
- **Sample ADOT Analyses**



Statewide Model	MOBILE6.2 Types
Auto	LDV
SUT	LDT1-4
MUT	HDV2-HDV8B
HDBS, HDBT (Assumed 0 for Pinal)	
MC (Used National Default)	

Annual VMT – By Vehicle Type

- **Recommended Method**



Statewide Model	MOVES Classes
Auto	Passenger Car
	Motorcycle
	(x%) of Light Trucks
	(x%) of Light Trucks
SUT	Single Unit Trucks
	Buses
MUT	Combination Trucks

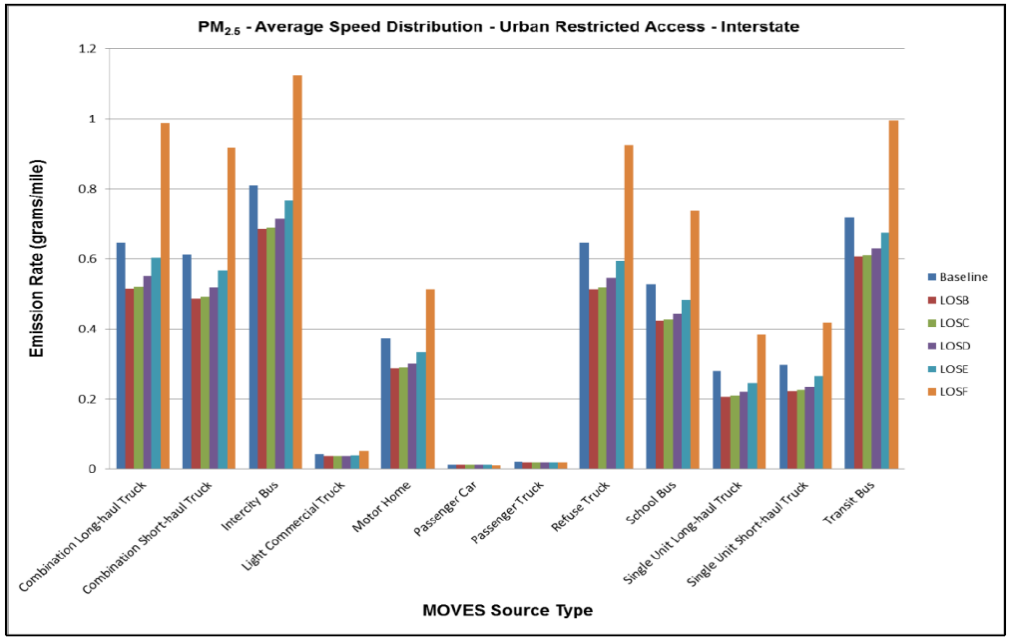
← Are other sources available?

Other VMT Disaggregation

- **Month/Day/Hour**
  - ✓ Evaluate if MOVES defaults representative of region
  - ✓ ADOT sample methods provide hourly fractions from statewide model
- **Road Type**
  - ✓ ADOT provides relationships between model facility groups to MOVES Road Type
- **Portion on Ramps**
  - ✓ Evaluate if MOVES defaults representative of region
  - ✓ If from model, fractions based on VHT not VMT

Travel Speed

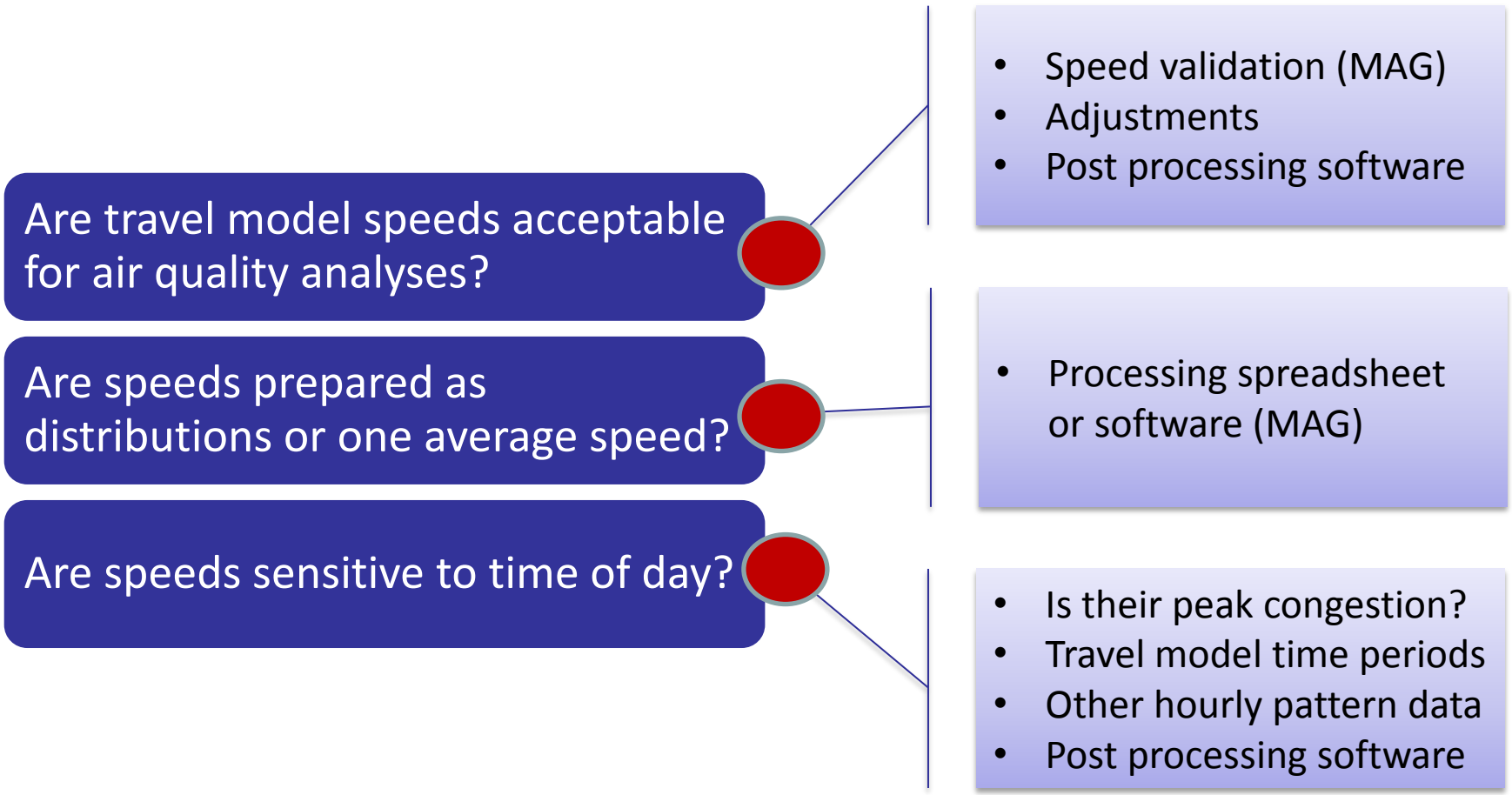
- In MOVES, emissions vary by speed
- In MOBILE6.2, PM not impacted by speed
- How can speeds be represented in MOVES?



Distribution of VHT to 16 Speed Bins by:

Road Type / Source Type / Hour of the Day

Travel Speed – Key Considerations



Assessing Preparation of MOVES Input Data

Vehicle Population

Population affects vehicle starts & evaporative emissions

Arizona Registration Data

- Are heavy trucks properly represented?
- Traffic from other counties

Convert to Mobile6.2 Categories

- Weight-based categories often have better correspondence to registration data

Use EPA Guidance for MOVES Conversion

Vehicle Population - Forecasting

- Must be forecasted
- Data sources to assist in determining growth rates:
  - ✓ VMT growth
  - ✓ Travel model trip data
  - ✓ Household / Population / Employment growth
  - ✓ Combination of above

Vehicle Ages

- Significant impact on emissions
- Based on registration data
- Similar issues as presented for Vehicle Population
- For Conformity/SIP modeling, ages cannot be forecasted to be newer than present year
- Important consideration when developing motor vehicle emission budgets

Other Data Issues

- Temps/humidity consistent with SIP
- Hourly temps required
- Default MOVES fuel data must be reviewed
- Forecast fuel types
- Default MOVES I/M data must be reviewed

Key Issues in Running MOVES

Batch Processing

- Ease of use - QA/QC
- Efficiency
- Linkage of pre / post processing programs

Pre-Post Processing

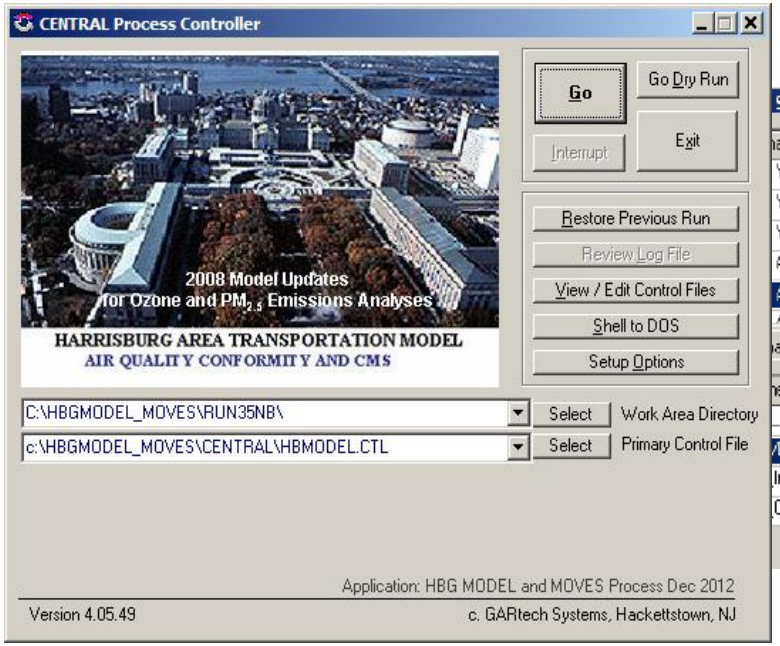
- Prepare MOVES inputs (e.g. VMT, Speed)
- Post process model speeds/VMT
- Apply MOVES rates (if necessary)

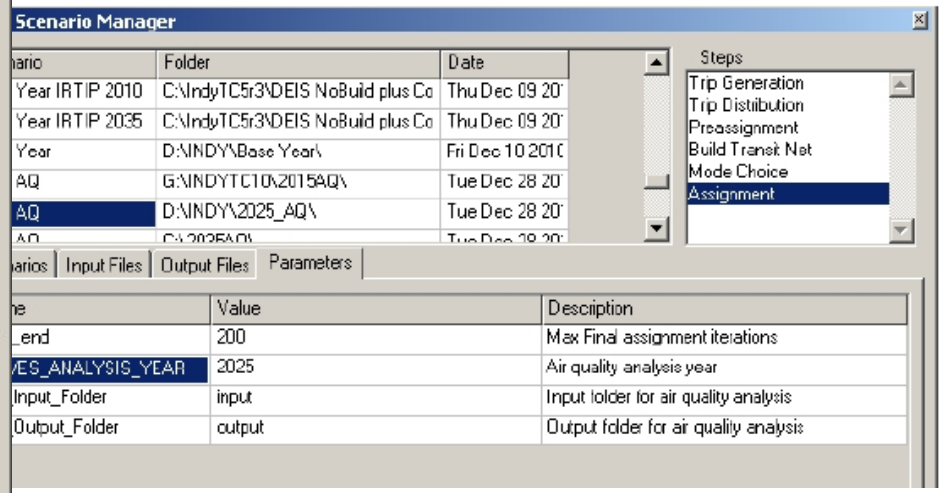
Inventory vs. Rate

- Affects post processing
- Detail of emissions

Batch / Post Processing - Methods

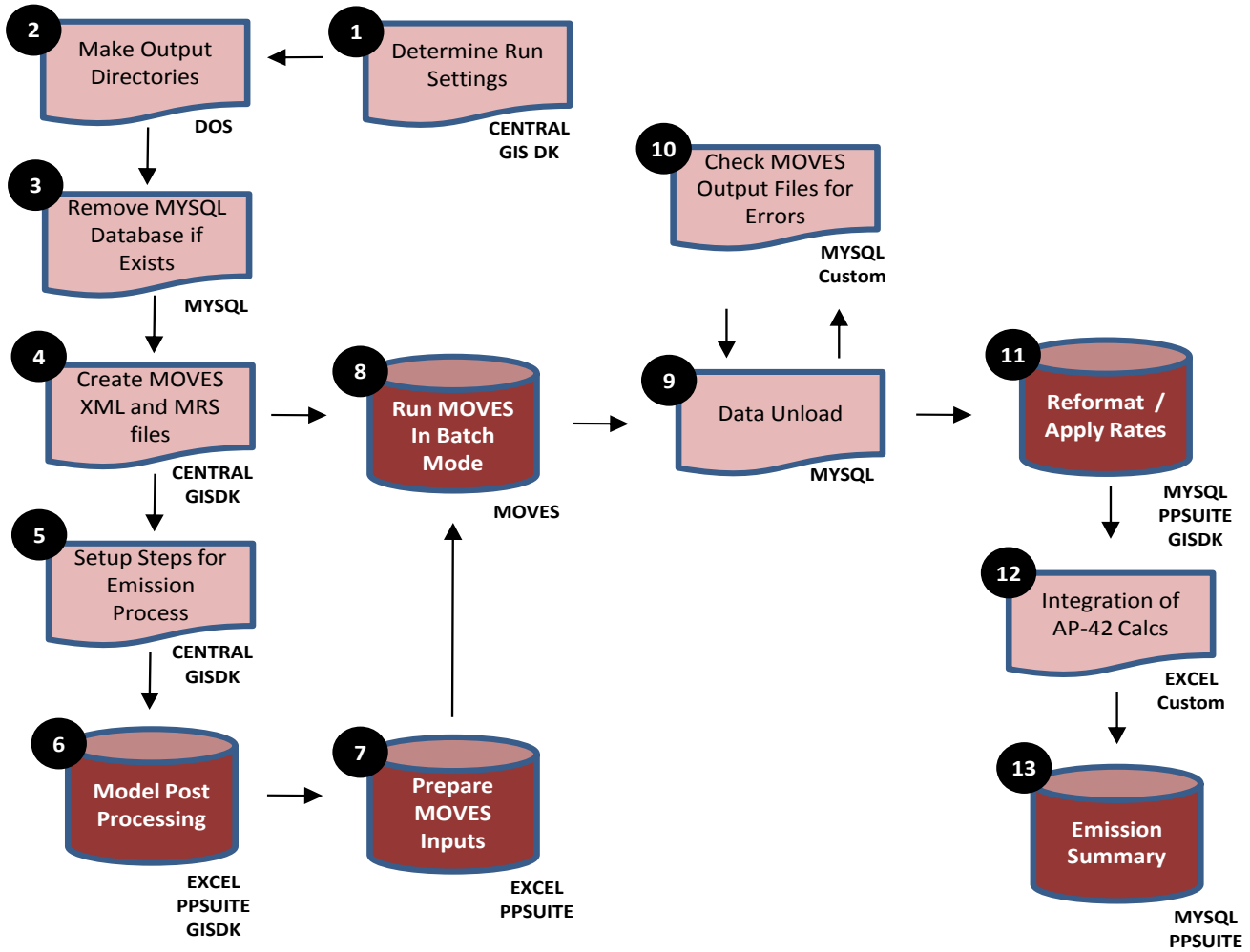
- Off-the shelf software (M6Link, Central, PPSUITE)
- Customized routines / programs (GISDK)
- EXCEL Spreadsheets



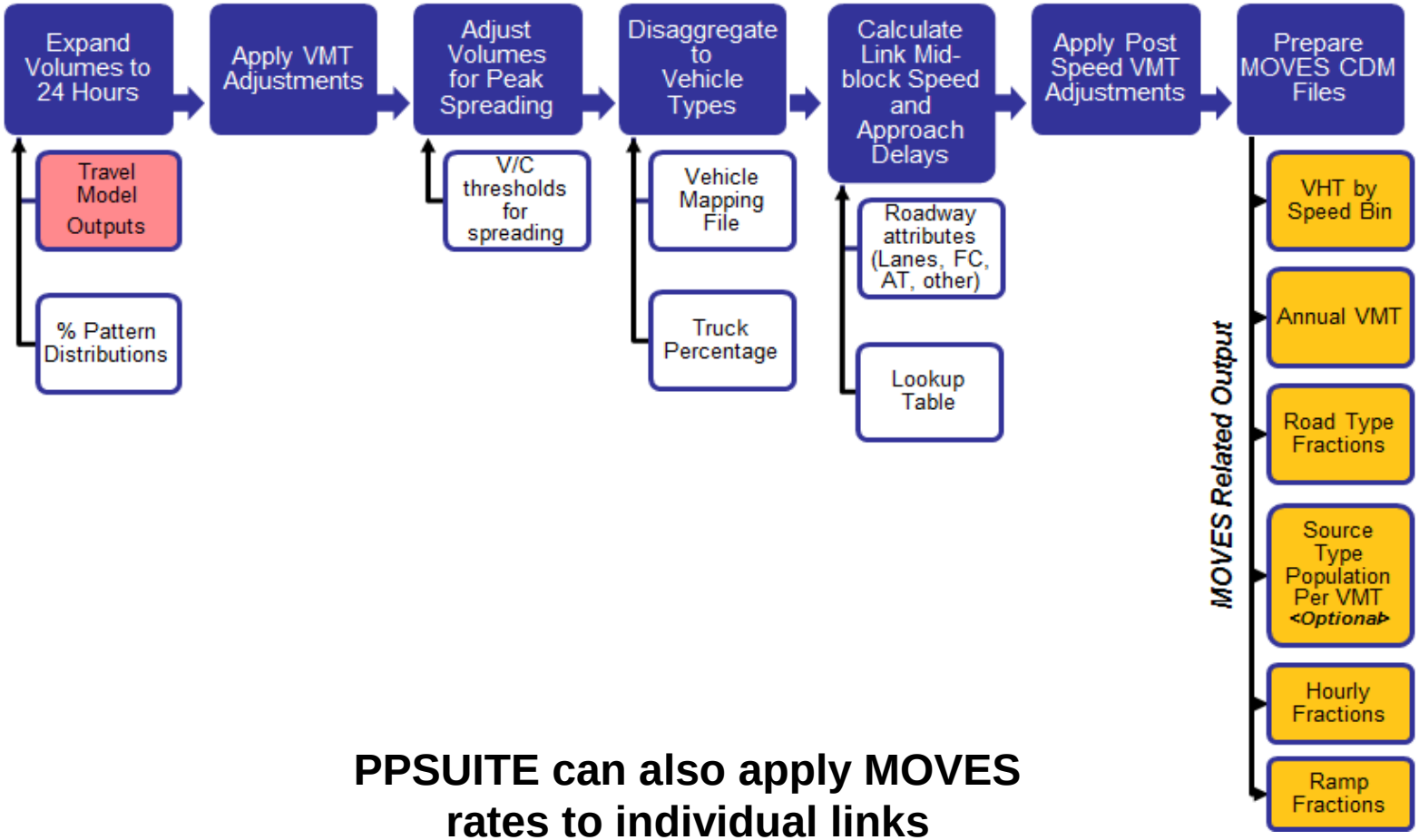


Running MOVES

Batch Processing - Example



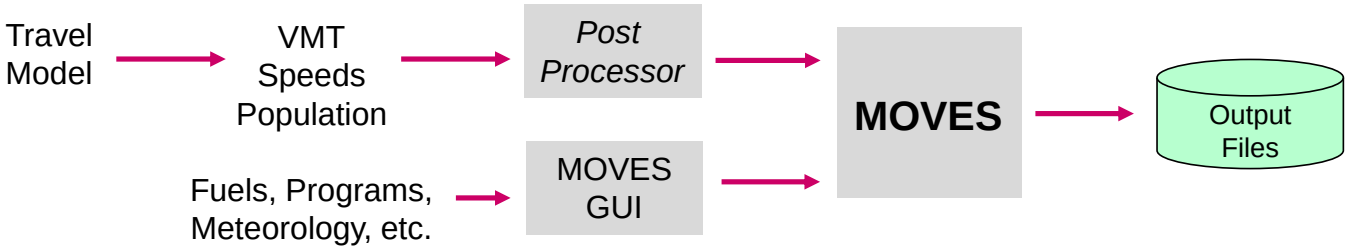
MOVES Pre/Post Processor- PPSUITE



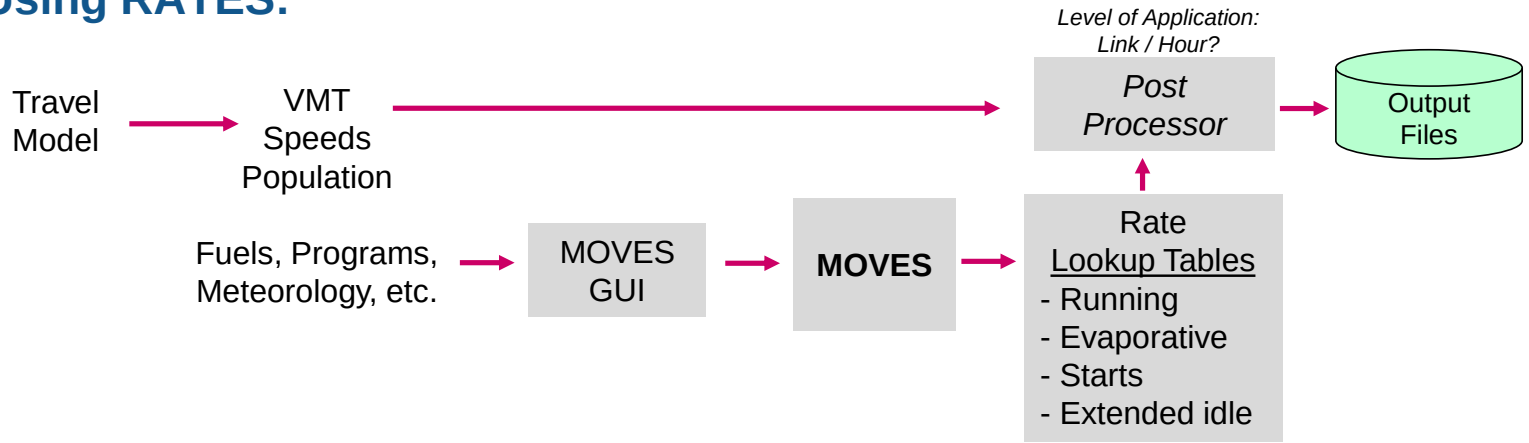
PPSUITE can also apply MOVES rates to individual links

Inventory vs. Rate Method

Using INVENTORY:



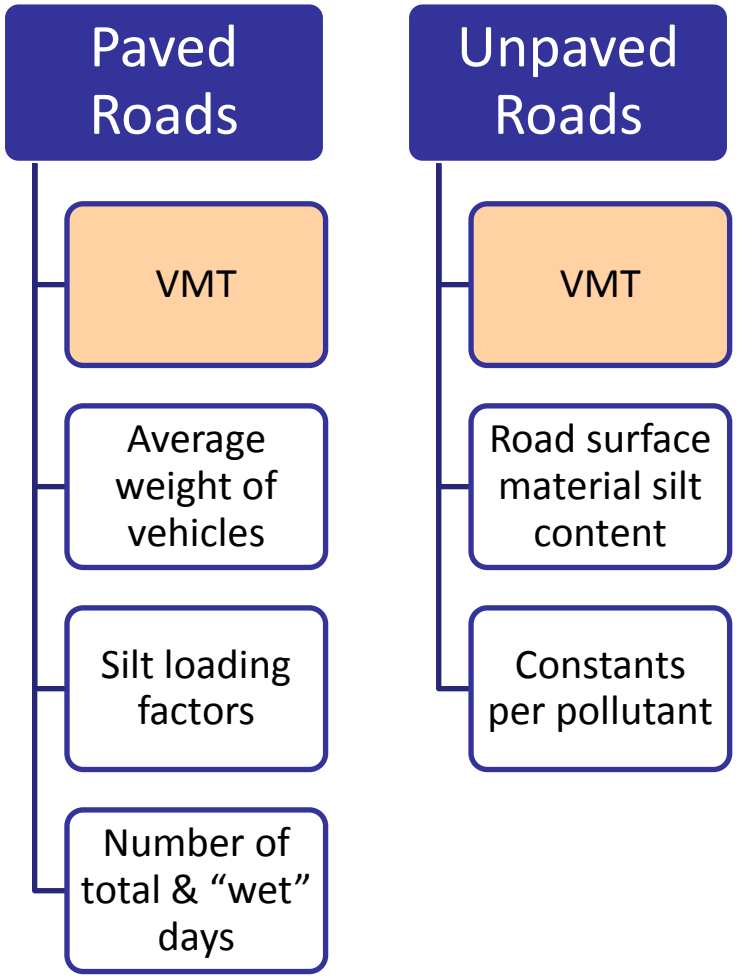
Using RATES:



Re-Entrained Road Dust

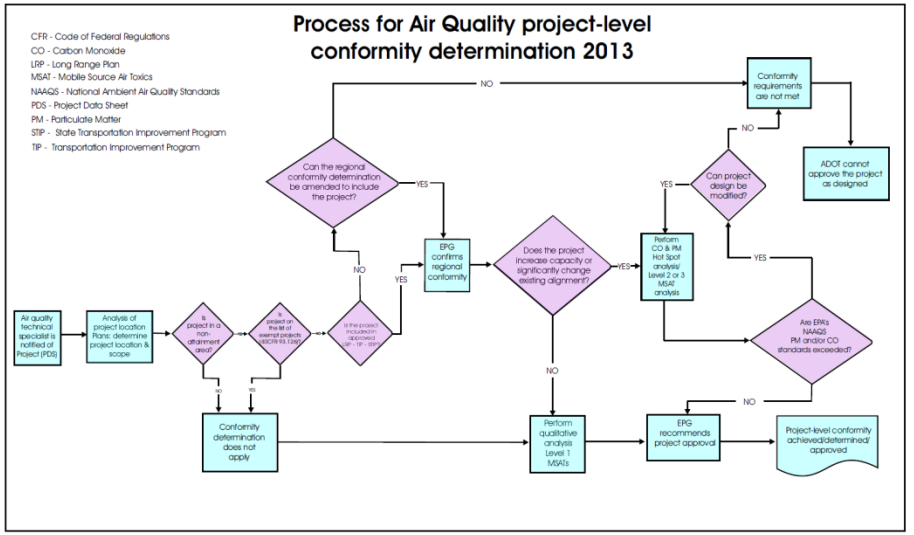
- Road dust is significant component of PM_{10} mobile source inventories
- MOVES does not estimate
- Use equations found in AP-42 Chapter 13
  - ✓ EPA document
  - ✓ Compilation of emission factor information
  - ✓ Empirical equations

Using AP-42 Equations (Data Needed)



Project-Level Procedures

PM Hot-Spot Requirements



- **Areas of Focus**
  - Projects requiring a quantitative analysis
  - Technical analysis procedures
- **Other State Efforts**
  - Limit projects requiring PM hotspot analyses
  - Limit interagency consultation to a small # of projects

Example of PA's Screening Process

Screening Level	Criteria Based On	Who Makes Decision?	What Data is Used?
LEVEL 1 Is the project exempt or does the project fall in an area that requires analysis?	Final Rule and EPA/FHWA guidance	PennDOT	Maps of nonattainment and maintenance areas and/or Exempt project table.
LEVEL 2 Is the project clearly not of air quality (AQ) concern?	Above plus agreed upon thresholds (Level 2 Flowchart)	PennDOT	Project traffic data, Base year traffic maps, and/or Intermodal facility information.
LEVEL 3 Does the project require more substantial review to determine if it is of AQ concern?	Above plus ICG review of project	ICG*	Project traffic data, Base-year traffic maps, and/or Intermodal facility information. May be supplemented by additional information.

Key Consultation if Analysis Needed

ICG Decisions On:	Analysis Approach
	Study Area
	Analysis Years
	Type of PM Emissions Analyzed
	Emission Models
	Background Concentrations
	Traffic Data Sources / MOVES Application Methods
	Receptor Locations
	Other Input Parameters

Conformity Procedures

Proposed Content of Working Paper

Review of Conformity Procedures

- Highlight technical issues (Pros/Cons)

Assess Available Data Sources

- Uses of each data source (Pros/Cons)

MOVES Modeling Issues

- Key technical issues / Pre-Post processing options

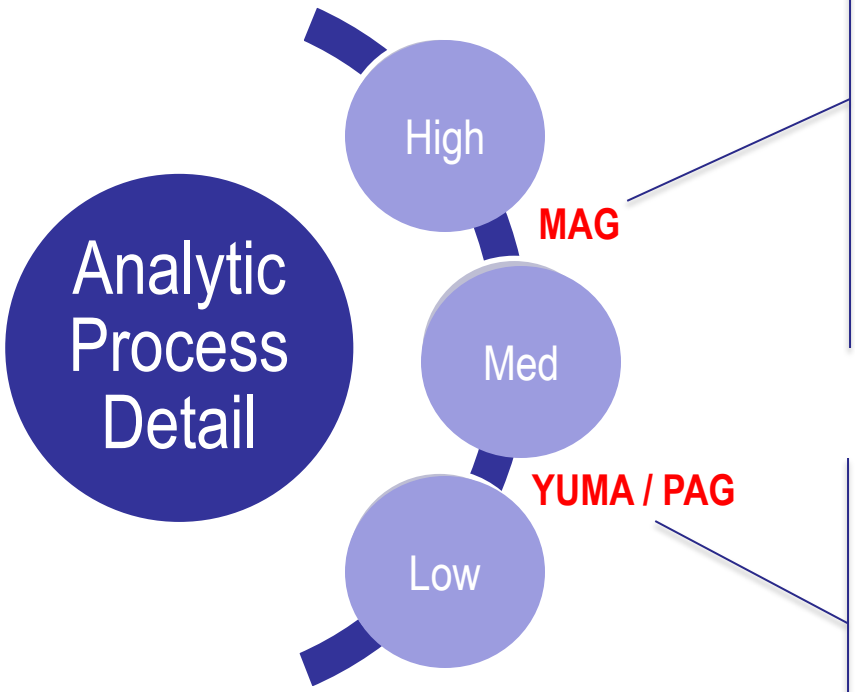
Recommendations

- Technical Standards / Efficiency / Quality-Control / Consistency

What are We Missing?

Conformity Procedures

Review of Conformity Analyses



- Travel model
- Batch Processing software (M6Link)
- Application of emission factors by time period speeds
- Account for speed distribution across links

- Travel model
- Application of emission factors by daily average speeds
- One average speed for each roadway type

Conformity Procedures

Data Sources

Data Source	Uses	Pros	Cons
MPO Travel Model	• Conformity • SIP Inventories	• Traffic diversion • Forecasts based on demographics	• Existing conditions • Accuracy of speeds?
Statewide Model	• Conformity • SIP Inventories	• Covers all counties	• Network coverage • Accuracy of speeds
HPMS VMT	• SIP Inventories • Investigative efforts • EPA NEI	• Support data for other methods	• Lack of detail for speed estimation
HPMS Databases	• Conformity • SIP Inventories • EPA NEI	• Covers all counties • Good source for existing conditions	• Project diversions • Forecasting • Pre/Post processing

Conformity Procedures

Key MOVES Modeling Considerations

Run Method	• Inventory vs. Rate
Input Speeds	• Level of detail for Input
Input Vehicle Pop	• New Input not in MOBILE
Quality Control	• MYSQL • File management

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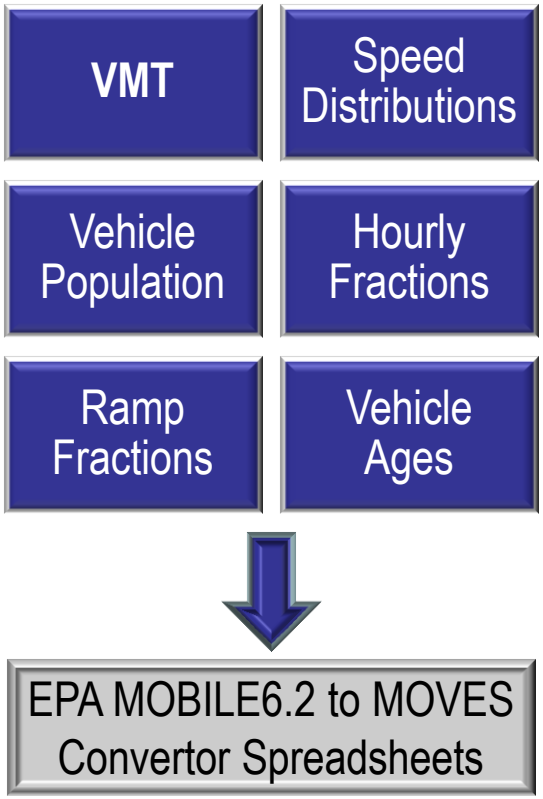
Sample MOVES application Pinal County

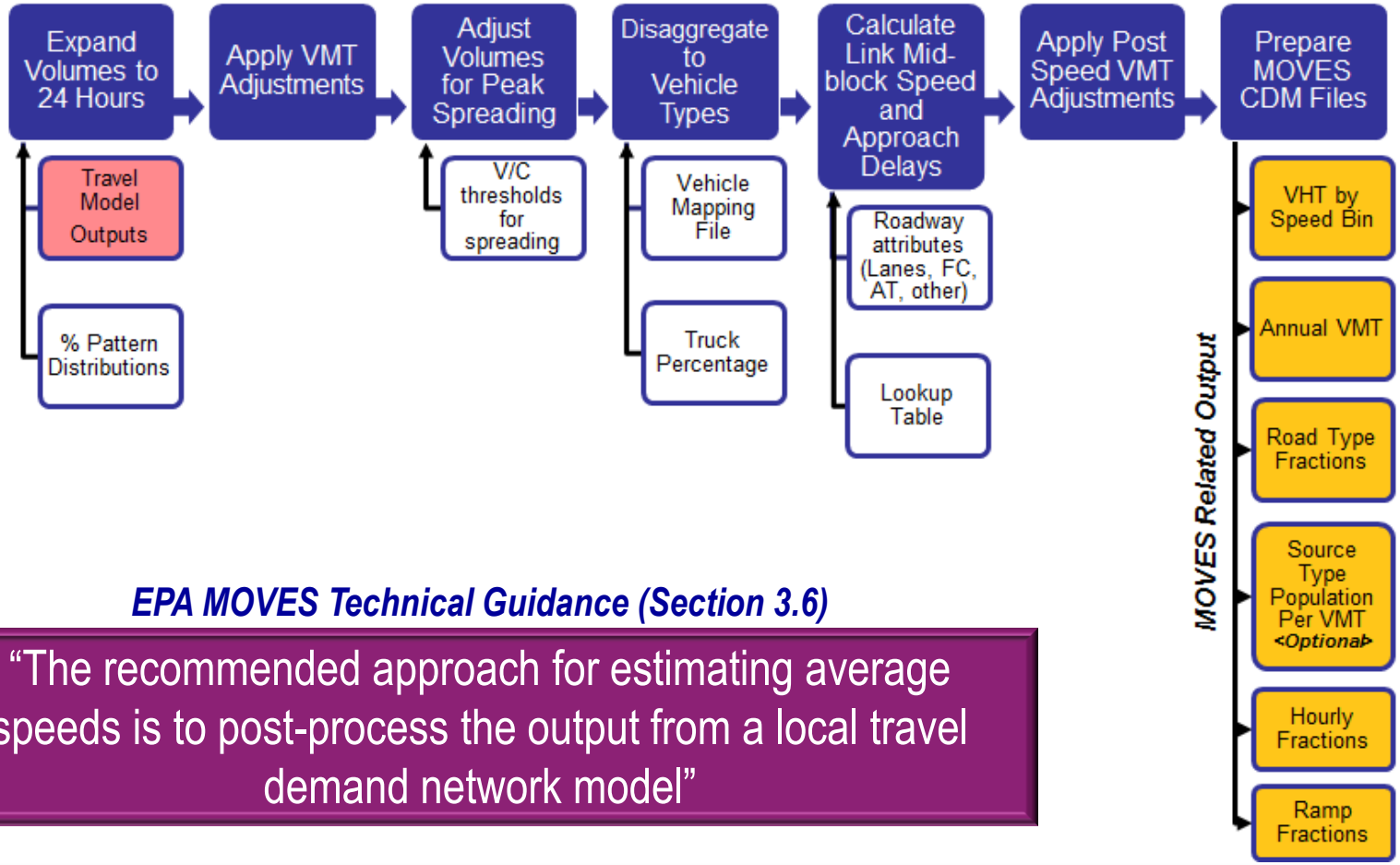


Areas of Concern for Further Discussion:

- Vehicle mapping for VMT
  - Use of MOBILE 6.2 defaults
  - Mapping of model to MOBILE6.2
- Use of model ramp VMT
- Use of heavy vehicle population and ages
- Validity of model speeds

Conformity Procedures

Potential Role of Post Processing



EPA MOVES Technical Guidance (Section 3.6)

"The recommended approach for estimating average speeds is to post-process the output from a local travel demand network model"

Conformity Procedures

What is in the Guidebook?

- Overview of EPA MOVES Model
- Assessment of Past Procedures
- Data Sources for AQ Analysis
- PM Emissions from Re-Entrained Road Dust
- Project-Level Hotspot Requirements
- Recommendations
  - MOVES County Data Manager Inputs
  - MOVES Operation